

REMARKS

Claims 1-22 and 27-54 are now pending in the present application. Claims 1-3, 6-20, 23-33 and 36-50 have been rejected. Claims 4, 5, 21, 22, 34 and 35 have been withdrawn from consideration as being directed to a non-elected invention. Claims 1 and 50 are generic. Claims 23-26 have been cancelled.

Claims 51-54 are newly added. Support for these new claims is as follows:

Claims 51-52: page 26, lines 6-24 of the corresponding PCT specification as filed.

Claims 53-54: page 1, lines 5-13 and page 26, lines 6-24 of the corresponding PCT application as filed.

Process claim 1 has been amended by introducing the subject matter of claims 23, 24 and 26 therein.

A similar amendment has been made to product claim 50. However, the process feature of monomers being "introduced in two or more sequential feeds" from claim 23 has been converted into the consequential product feature of the heteropolymeric particles "having a core/sheath structure". Support for this amendment may be found at least in the paragraph bridging pages 17 and 18 of the corresponding PCT specification as filed.

Claims 23-26 have consequently been deleted.

The remaining proposed claim amendments are believed to be self-explanatory.

The applicant would also like to introduce four new application focused claims based on the aqueous dispersion of heteropolymeric particles according to the invention. However, they do not wish to pursue such claims if they are likely to provoke a unity of invention type

rejection. With this in mind, I refer you to the four claims proposed below, one or more of which are to be introduced only if you believe there is a good chance it/they can be pursued in the present application along side the pending claims.

"A method of preparing a paint, adhesive, textile coating, carpet backing or construction material, the method comprising combining a paint, adhesive, textile coating, carpet backing or construction material additive, respectively, with an aqueous dispersion of heteropolymeric particles according to claim 50." (see at least page 26, lines 6-24 of the corresponding PCT specification as filed for support)

"A method of preparing a paint, the method comprising combining a paint additive with an aqueous dispersion of heteropolymeric particles according to claim 50." (see at least page 26, lines 6-24 of the corresponding PCT specification as filed for support)

"A paint, adhesive, textile coating, carpet backing or construction material comprising an aqueous dispersion of heteropolymeric particles according to claim 50." (see at least page 1, lines 5-13 and page 26, lines 6-24 of the corresponding PCT specification as filed for support)

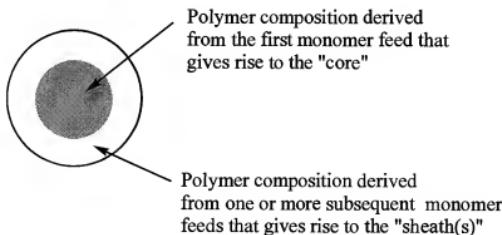
"A paint comprising an aqueous dispersion of heteropolymeric particles according to claim 50." (see at least page 1, lines 5-13 and page 26, lines 6-24 of the corresponding PCT specification as filed for support)

To appreciate how the subject matter defined by the claims of the application is distinguished over the prior art, it is important to have a good understanding of the somewhat complex process/product features of the invention.

As is described in at least the paragraph bridging pages 5 and 6 of the corresponding PCT application as filed, the applicant surprisingly found that polymer particles comprising the

polymerised residues of ionisable and non-ionisable hydrophilic monomers, the likes of which are specifically located throughout the particle composition at specific concentrations, can provide for aqueous dispersions of polymer particles having high viscosity and good levelling and flow properties. Products such as paints formulated using these aqueous dispersions advantageously require little or no additional rheological control additives, are versatile and can attain viscosity while still demonstrating good leveling, flow and gloss properties.

The specific features of the polymer particles in accordance with the invention can be explained in more detail with reference to the simplified cross sectional view illustrated below:



With reference to the illustration above, a polymer particle in accordance with the invention comprises a core derived from the first monomer feed and a sheath(s) derived from one or more subsequent monomer feeds.

The process according to the invention for preparing the particles includes the following features:

- The monomer composition used to prepare the particles has at any point in time less than 5 wt% of ionisable monomer;
- At least a 30 wt% portion of the total amount of monomers polymerised is maintained with an ionisable monomer content of from 0.5 to less than 5 wt%. This feature gives

rise to polymer particle having a segment or region that represents at least 30 wt% of the total particle and has a concentration of ionisable monomer of from 0.5 to less than 5 wt%;

- The total amount of non-ionisable hydrophilic and ionisable monomer used must represent at least 75 wt% of the total monomers polymerised to form the particle;
- The core of the particle (derived from the first monomer feed) must represent at least 30 wt% of the particle; and
- The core of the polymer particle (derived from the first monomer feed) must contain less than 20 wt% of the total amount of ionisable monomer used to prepare the particle.

The advantageous rheological properties of aqueous dispersions in accordance with the invention are believed to be derived primarily from unique swelling and deswelling characteristics of the heteropolymeric particles. Such unique swelling and deswelling characteristics are in turn believed to be derived from at least the concentration and location requirements of the ionisable and non-ionisable hydrophilic monomers/monomer residues used in accordance with the invention.

Turning to the specific numbered rejections raised by the Examiner in the Action:

1. Despite our traversal, the Examiner notes that the requirement for an Election of Species has been made final. It is believed that the non-elected claims should be rejoined with the remaining pending claims if these claims are considered to be in condition for allowance.
- 2-5. The Examiner contends that the claims of the application are anticipated by, or in the alternative, obvious over US 3,875,099 of Kurth *et al.* under 35 USC 102(b) and under 35 USC 103(a). These rejections are respectfully traversed. Withdrawal of these rejections and allowance of the claims are requested.

2-5. It is believed that the claims of the application in their amended form are clearly distinguished over the disclosure and teachings of Kurth *et al.*

Kurth *et al* relates to a method for preparing high-viscosity, shear-stable, freeze-thaw stable, and electrolyte-stable dispersions of synthetic acrylic resins.

The specified properties of the acrylic resins are said to be derived by preparing the resins with a relatively low carboxylic acid content that is present only in one portion of the polymer that forms the resin (see at least column 1, lines 53-57).

Notably, the compositional requirements of the acrylic resins disclosed and taught in Kurth *et al* are different from the compositional requirements of heteropolymeric particles claimed in accordance with the present invention. This difference in compositional requirements is in fact reflected by the different properties exhibited by the polymer according to each invention.

With regard to compositional requirements, the acrylic resins prepared in accordance with Kurth *et al* require at least 70 % of the carboxylic acid monomer to be added to the polymerisation vessel in a manner such that the acid portion added is at any given time between 3 and 15 % by weight of the total amount of monomers being concurrently added (see at least the paragraph bridging columns 2 and 3). As is described at least at column 4, lines 30-46, addition of the acid monomer in this manner is intended to provide for "polymer portions relatively rich in carboxyl groups, which fact is of considerable importance to the properties of the dispersion" (emphasis added).

In other words, despite having an overall relatively low acid monomer content, the properties of the acrylic resins according to Kurth *et al* are predicated upon having at least a portion of polymer with a relatively high concentration of acid monomer residues (i.e., as high as 15%).

As is outlined above, the claims according to the present invention not only require that the heteropolymeric particles have a relatively low overall ionisable monomer content (i.e., less than 5 wt %), but the reaction medium at any point in time must comprise less than 5 wt % of the ionisable monomer. Accordingly, unlike the acrylic resin according to Kurth *et al*, the heteropolymeric particles in accordance with the present invention specifically teach away from forming a portion of the polymer particles having a relatively high concentration of acid monomer.

An important feature of the claims according to the present invention is that the total amount of non-ionisable hydrophilic ethylenically unsaturated monomers and ionisable ethylenically unsaturated monomers polymerised constitutes at least 75 wt % the total amount of monomers polymerised to form the heteropolymeric particles.

Notably, Kurth *et al* fails to disclose or suggest any such relationship between the ionisable and non-ionisable hydrophilic monomer content. Furthermore, except for Example 11, all examples of the acrylic resins disclosed in Kurth *et al* demonstrate an ionisable and non-ionisable hydrophilic monomer content well below the required 75 wt % according to the claims of the present application.

Example 11 in Kurth *et al* does inadvertently disclose an acrylic resin composition having an ionisable and non-ionisable hydrophilic monomer content of at least 75 wt %. However, as noted above, the heteropolymeric particles according to the present invention derive their unique properties from a combination of features.

In addition to the aforementioned "at least 75 wt %" requirement, the claims according to the present invention also require that the "reaction medium have a composition which is maintained with an ionisable ethylenically unsaturated monomer content of from 0.5 to less than 5 wt % throughout polymerisation of at least 30 wt % of the total amount of monomers polymerised to form the heteropolymeric particles" (emphasis added).

Furthermore, the first feed of the polymerisation must comprise less than 20 wt % of the total amount of ionisable monomers polymerised to form the heteropolymeric particles.

Example 11 in Kurth *et al* demonstrates at best a reaction medium having a composition which is maintained with ionisable monomer of about 3 wt % through only 25 wt % of the total amount of monomers polymerised to form the resin. Furthermore, the first feed according to Example 11 comprises more than 75 wt % of the total amount of ionisable monomers that are polymerised to form the acrylic resin.

It will be appreciated from these comments that the compositional requirements of the acrylic resin disclosed in Kurth *et al* are vastly different from those of the heteropolymeric particles in accordance with the present invention. Such differences in composition are not merely coincidental, but instead are by design. It is submitted that Kurth *et al* specifically sets out to prepare acrylic resins having different properties to those exhibited by the heteropolymeric particles in accordance with the invention. This position may be supported at least by reference to the disclosure in Kurth *et al* at column 2, lines 43-55. Here, Kurth *et al* points out that the invention disclosed therein is distinguished over the prior art "either in that monomers containing a carboxy group are added in a relatively high overall concentration or in that the largest portion of the acid monomers is added either before the other monomers or is first added in the last polymerisation stage". Kurth *et al* goes on to point out disadvantages associated with such different features in that "dispersions are produced the viscosity of which increases extraordinarily rapidly at pH values above 8-9 or the stability of which is unsatisfactory".

Kurth *et al* is not at all interested in preparing an acrylic resin with rapid swelling properties. In addition to the comments set forth directly above, this is reflected by the resins produced according to the Examples in Kurth *et al* which typically require extended periods of time at elevated temperature (2 hours at 80 °C) under basic conditions in order to promote swelling.

Notably, an advantage according to the present invention is the unique rapid swelling and deswelling properties of the heteropolymeric particles. Contrary to the teaching in Kurth *et al.*, such particles may in fact be prepared where the acid monomer is "first added in the last polymerisation stage" (see the examples of the present application where the acid monomer is only introduced in the second and last stage of the polymerisation).

Accordingly, Kurth *et al* clearly teaches away from certain essential features that give rise to the advantageous properties of the heteropolymeric particles according to the present invention.

The claims of the present application are therefore believed to be distinguished over Kurth *et al.*.

6-7. The Examiner has rejected claims 12 and 13 under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. In particular, the Examiner notes possible tension between the 55 wt % and 75 wt % features of these claims, respectively, and the feature in claim 1 of "wherein the monomers in said reaction medium at any point in time comprise less than 5 wt % of ionisable ethylenically unsaturated monomer".

From the comments above concerning the features of the polymer particles, it can be appreciated that the Examiner's rejection appears to stem from a misunderstanding of the relevant features in the claims.

Thus, the feature in the claim of "the monomers in said reaction medium at any point in time comprise less than 5 wt % of ionisable ethylenically unsaturated monomer" in effect prevents the resulting polymer particles from having a section or region of a relatively high concentration of ionisable monomer residue. In other words, this feature simply relates to the concentration of ionisable monomer allowed in any of the monomer feeds.

The next feature in claim 1 states that "for at least part of the polymerisation the monomers in said reaction medium have a composition which is maintained with an ionisable ethylenically unsaturated monomer content of from 0.5 to less than 5 wt % throughout polymerisation of at least 30 wt % of the total amount of monomers polymerised to form the heteropolymeric particles" (emphasis added). This feature of the claim provides for a minimum proportion of the heteropolymeric particles which have an ionisable monomer residue content of from 0.5 to less than 5 wt %.

Claims 12 and 13 simply extend this portion of the heteropolymeric particle to at least 55 wt % or at least 75 wt %, respectively. When considering the construction of these claims, it is to be noted that the language of claim 12 clearly makes reference to the "said at least part of the polymerisation" defined in claim 1.

Claims 12 and 13 are therefore in no way considered to cause any tension with the subject matter defined in claim 1.

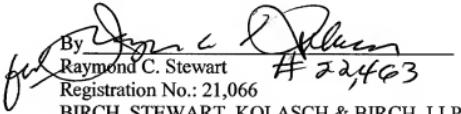
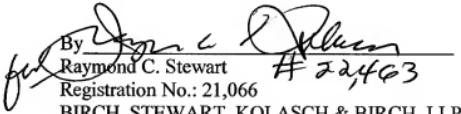
It is believed that this application is now in condition for allowance. In view of the above amendments and remarks, reconsideration of the rejections and favorable action on the claims are respectfully requested.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Raymond C. Stewart, Registration No. 21066, at the telephone number of the undersigned below to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Director is hereby authorized in this, concurrent, and future replies to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

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Respectfully submitted,


By 
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